

CLAIMS

1. A method of allocating memory in a data processing system having a memory, the method comprising the steps of:

receiving a memory allocation request from a running process, the request including data relating to the size of the block of memory required and an indication of a mask bit pattern;

selecting a block of memory of appropriate size and having an address including a bit pattern corresponding correctly to the mask bit pattern; and

allocating the selected block of memory to the process.

2. A method according to claim 1, further comprising the step of the process sending the memory allocation request to a memory allocation mechanism.

3. A method according to claim 1, wherein the step of allocating the selected block comprises sending an allocation reply to the process, the allocation reply indicating the address of the selected memory block.

4. A method according to claim 1, further comprising the steps of the process embedding one or more bits of metadata into the address of the allocated block of memory, and storing the encoded address.

5. A method according to claim 4, wherein the step of embedding metadata comprises replacing certain bits of the address of the allocated block of memory with flag bits.

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6. A method according to claim 1, wherein a memory allocation mechanism has one or more list(s) of free memory blocks, and the selecting step comprises searching through a list for a memory block having an address which corresponds correctly to the mask bit pattern.

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7. A method according to claim 6, wherein the memory allocation mechanism also has one or more lists of allocated memory blocks and the allocation step comprises taking the selected block off a list of free memory blocks and adding the selected block to a list of allocated blocks.

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8. A method according to claim 1, wherein the selecting step comprises splitting a memory block larger than the requested size into two or more blocks, one of the split blocks having an appropriate size for the memory allocation and having a memory address including a bit pattern which corresponds correctly to the mask bit pattern.

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9. A method according to claim 1, further comprising the step of the process selecting a mask bit pattern.

10. A method according to claim 1, wherein the indication of the mask bit pattern comprises a mask, specifying certain bits of an address, and a set of values indicating the required value for each of the specified bits.

11. A method according to claim 10, wherein the step of selecting a memory block includes checking whether each of the certain bits of the memory address of a free block corresponds correctly to the required value indicated in the memory allocation request.

12. A method according to claim 1, further comprising the step of the process storing data in the allocated memory.

13. A method of performing a memory update in a data processing system having a memory, the method comprising the steps of:

reading an encoded memory address from memory;
comparing the encoded memory address with a mask bit pattern to determine whether one or more flag bits embedded in the encoded memory address are set;
resetting one or more of the flag bits in the encoded memory address; and
storing the updated encoded memory address in the memory.

14. A method according to claim 13, further comprising the steps of decoding the memory address by replacing the

one or more embedded flag bits with bits of the memory address, in dependence on the mask bit pattern, and reading data from that memory address.

5 15. A memory allocation mechanism for a data processing system, the mechanism being operable to: ✓

10 receive a memory allocation request from a process running on the data processing system, the memory allocation request including data indicating the size of a memory block required and a mask bit pattern;

 select a block of memory of appropriate size and having an address including a bit pattern which corresponds correctly to the mask bit pattern; and

15 allocate the selected block of memory to the process.

20 16. A memory allocation mechanism according to claim 15, operable to send an allocation reply to the process indicating the address of the selected memory block.

25 17. A memory allocation mechanism according to claim 15, operable to maintain one or more list(s) of free memory blocks, and to search through a list for a memory block having an address which corresponds correctly to the mask bit pattern.

30 18. A memory allocation mechanism according to claim 17, operable to take the selected block off a list of free memory blocks and add the selected block to a list of allocated blocks.

19. A memory allocation mechanism according to claim 15, operable to receive an indication of the mask bit pattern comprising a mask, specifying certain bits of an address, and a set of values indicating the required value for each of the specified bits; and wherein selecting a memory block comprises checking whether the value of each of the specified bits of the memory address of a block corresponds correctly to the required value indicated in the set of values.

20. A program element comprising program code operable to provide the memory allocation mechanism according to claim 15.

21. The program element of claim 20 on a carrier medium.

22. A carrier medium comprising a computer program element including computer program instructions to implement the method of claim 1.

23. The carrier medium of claim 22, comprising one or more of the following set of media: a signal, a magnetic disk or tape, solid-state memory, a compact disk and a digital versatile disk.

24. A data processing system comprising a memory and a memory allocation mechanism according to claim 15.

25. A computer program product directly loadable into the internal memory of a digital computer, comprising

software code portions for performing, when said product is run on a computer, the method of allocating memory in a data processing system having a memory, the method comprising the steps of:

5 receiving a memory allocation request from a running process, the request including data relating to the size of the block of memory required and an indication of a mask bit pattern;

10 selecting a block of memory of appropriate size and having an address including a bit pattern corresponding correctly to the mask bit pattern; and

 allocating the selected block of memory to the process.